



MATHS

BOOKS - RD SHARMA MATHS (HINGLISH)

TRIGONOMETRIC RATIOS

Others

1. The altitude AD of a $\triangle ABC$, in which $\angle A$ obtuse and, $AD = 10\text{cm}$. If $BD=10\text{cm}$ and $CD=10\sqrt{3}\text{cm}$, determine $\angle A$.



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2. A rhombus of side 20cm has two angles of 60° each. Find the length of the diagonals.

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3. ABC is a right triangle, right angled at C . If $A = 30^{\circ}$ and $AB = 40$ units, find the remaining two sides and $\angle B$ of ABC .

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4. Evaluate the following: $\frac{\cos 37^{\circ}}{\sin 53^{\circ}}$

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5. Find acute angles A and B , if

$$\sin(A + 2B) = \frac{\sqrt{3}}{2} \text{ and } \cos(A + 4B) = 0, A > B.$$

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6. In an acute angled triangle ABC , if $\tan(A + B - C) = 1$ and $\sec(B + C - A) = 2$, find the value of A , B and C .

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7. If each of α , β and γ is a positive acute angle such that

$$\sin(\alpha + \beta - \gamma) = \frac{1}{2},$$

$$\cos(\beta + \gamma - \alpha) = \frac{1}{2} \text{ and } \tan(\gamma + \alpha - \beta) = 1, \text{ find the}$$

values of α , β and γ .

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8. In a ABC , right angled at A , if $AB = 12$, $AC = 5$ and $BC = 13$, find all the six trigonometric ratios of angle B .

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9. If $\cos B = \frac{1}{3}$, find the other five trigonometric ratios.

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10. In a ABC , right angled at A , if $AB = 5$, $AC = 12$ and $BC = 13$, find $\sin B$, $\cos C$ and $\tan B$.

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11. If $\sin \theta = \frac{a^2 - b^2}{a^2 + b^2}$, find the values of other five trigonometric ratios.

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12. If $\cos ec A = \sqrt{10}$, find other five trigonometric ratios.

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13. If $\tan A = \sqrt{2} - 1$ show that $\sin A \cos A = \frac{\sqrt{2}}{4}$

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14. If $\cos ec A = 2$, find the value of $\frac{1}{\tan A} + \frac{\sin A}{1 + \cos A}$

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15. Evaluate the following: $\sin 39^\circ - \cos 51^\circ$

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16. The value of $\frac{\tan 55^\circ}{\cot 35^\circ} + \cot 1^\circ \cot 2^\circ \cot 3^\circ \cot 90^\circ$, is -2 (b)
2 (c) 1 (d) 0

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17. If $A + B$ is 90° , then
 $\frac{\tan A \cdot \tan B + \tan A \cdot \cot B}{\sin A \cdot \sec B} - \frac{\sin^2 B}{\cos^2 A}$ is equal to:

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18. If $\tan 2A = \cot(A - 18^\circ)$, where $2A$ is an acute angle, find the value of A .

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19. Prove the following:

$$\sin \theta \sin(90^\circ - \theta) - \cos \theta \cos(90^\circ - \theta) = 0$$

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20. Find an acute angle θ , when $\frac{\cos \theta - \sin \theta}{\cos \theta + \sin \theta} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$

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21. If $\sin(A + B) = 1$ and $\cos(A - B) = \frac{\sqrt{3}}{2}$, then find A and B .

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22. Evaluate each of the following:

$$\cot 12^{\circ} \cot 38^{\circ} \cot 52^{\circ} \cot 60^{\circ} \cot 78^{\circ}$$

$$\tan 5^{\circ} \tan 25^{\circ} \tan 30^{\circ} \tan 65^{\circ} \tan 85^{\circ}$$

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23. Prove that: $\tan 10^{\circ} \tan 15^{\circ} \tan 75^{\circ} \tan 80^{\circ} = 1$

$$\tan 1^{\circ} \tan 2^{\circ} \tan 3^{\circ} \tan 89^{\circ} = 1 \quad \cos 1^{\circ} \cos 2^{\circ} \cos 3^{\circ} \cos 180^{\circ} = 0$$

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24. If $A + B = 90^\circ$, prove that

$$\sqrt{\frac{\tan A \tan B + \tan A \cot B}{\sin A \sec B} - \frac{\sin^2 B}{\cos^2 A}} = \tan A$$

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25. If $\sin 5\theta = \cos 4\theta$, where 5θ and 4θ are acute angles, find the value of θ .

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26. If $\tan \theta + \frac{1}{\tan \theta} = 2$, find the value of $\tan^2 \theta + \frac{1}{\tan^2 \theta}$

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27. Evaluate each of the following in the simplest form:

$$\csc 30^{\circ} + \cot 45^{\circ} \qquad \cos 30^{\circ} \cos 45^{\circ} - \sin 30^{\circ} \sin 45^{\circ}$$

$$\tan 30^{\circ} \sec 45^{\circ} + \tan 60^{\circ} \sec 30^{\circ}$$

$$\sin 30^{\circ} \cos 45^{\circ} + \cos 30^{\circ} \sin 45^{\circ}$$

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28. In a right triangle BC , right angled at B , the ratio of

$AB \rightarrow AC$ is $1: \sqrt{2}$. Find the values of $\frac{2 \tan A}{1 + \tan^2 A}$ and (ii)

$$\frac{2 \tan A}{1 - \tan^2 A}$$

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29. Find the value of x in each of the following: (i)

$$\tan 3x = \sin 45^{\circ} \cos 45^{\circ} + \sin 30^{\circ}, \qquad \text{(ii)}$$

$$\cos x = \cos 60^0 \cos 30^0 + \sin 60^0 \sin 30^0 \quad , \quad \text{(iii)}$$

$$\sin 2x = \sin 60^0 \cos 30^0 - \cos 60^0 \sin 30^0.$$



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30. If θ is an acute angle and $\tan \theta + \cot \theta = 2$, find the value of $\tan^7 \theta + \cot^7 \theta$.

A. 0

B. 1

C. 2

D. 3

Answer: C



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31. Prove that:
$$\frac{\cos 30^\circ + \sin 60^\circ}{1 + \cos 60^\circ + \sin 30^\circ} = \frac{\sqrt{3}}{2}$$



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32. Find the value of θ in each of the following: (i)

$2 \sin 2\theta = \sqrt{3}$ (ii) $2 \cos 3\theta = 1$ (iii) $\sqrt{3} \tan 2\theta - 3 = 0$



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33. An equilateral triangle is inscribed in a circle of radius 6 cm. Find its side.

A. $6\sqrt{3}$

B. $\frac{6}{\sqrt{3}}$

C. $8\sqrt{3}$

D. $2\sqrt{3}$

Answer: A

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34. If $\tan A = 1$ and $\tan B = \sqrt{3}$, evaluate $\cos A \cos B - \sin A \sin B$.

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35. If $\sec 4A = \operatorname{cosec}(A - 20^\circ)$, where $4A$ is an acute angle, find the value of A .

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36. Evaluate :

$$4(\sin^4 30^\circ + \cos^4 60^\circ) - \frac{2}{3}(\sin^2 60^\circ - \cos^2 45^\circ) + \frac{1}{2}\tan^2 60^\circ$$

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37. Evaluate : $\frac{\sin 50^\circ}{\cos 40^\circ} + \frac{\csc 40^\circ}{\sec 50^\circ} - 4\cos 50^\circ \csc 40^\circ$

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38. Evaluate : $\tan 35^\circ \tan 40^\circ \tan 45^\circ \tan 50^\circ \tan 55^\circ$

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39. Evaluate :

$$\operatorname{cosec}(65^\circ + \theta) - \sec(25^\circ - \theta) - \tan(55^\circ - \theta) + \cot(35^\circ + \theta)$$

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40. Evaluate : $\tan 7^\circ \tan 23^\circ \tan 60^\circ \tan 67^\circ \tan 83^\circ$

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41. Evaluate :

$$\frac{2\sin 68^\circ}{\cos 22^\circ} - \frac{2\cot 15^\circ}{5\tan 75^\circ} - \frac{3\tan 45^\circ \tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ}{5}$$

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42. Evaluate : (

$$\frac{3\cos 55^\circ}{7\sin 35^\circ} \Bigg) - \left(\frac{4}{7}\right) \frac{\cos 70^\circ \cos 20^\circ}{\tan 5^\circ \tan 25^\circ \tan 45^\circ \tan 65^\circ \tan 85^\circ},$$

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43. If $A = B = 60^\circ$, verify that (i)

$$\cos(A - B) = \cos A \cos B + \sin A \sin B \quad \text{(ii)}$$

$$\sin(A - B) = \sin A \cos B - \cos A \sin B \quad \text{(iii)}$$

$$\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$$

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44. If $5 \tan \theta - 4 = 0$, then the value of $\frac{5 \sin \theta - 4 \cos \theta}{5 \sin \theta + 4 \cos \theta}$ is

A. $\frac{5}{3}$

B. $\frac{5}{6}$

C. 0

D. $\frac{1}{6}$

Answer: C



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45. If $8 \tan x = 15$, then $\sin x - \cos x$ is equal to

A. $\frac{8}{17}$

B. $\frac{17}{7}$

C. $\frac{1}{17}$

D. $\frac{7}{17}$

Answer: D



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